

A NEW SUBSPECIES OF *CROITANA ARENARIA* E. D. EDWARDS (LEPIDOPTERA: HESPERIIDAE) FROM EYRE PENINSULA, SOUTH AUSTRALIA

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Abstract

Croitana arenaria pilepudla subsp. n. is described from northern Eyre Peninsula, South Australia. Adults and male genitalia are illustrated and compared with nominotypical *C. arenaria* E.D. Edwards from central Australia.

Introduction

The genus *Croitana* Waterhouse presently contains three species, *C. aestiva* E.D. Edwards, *C. arenaria* E.D. Edwards and *C. croites* (Hewitson), (Edwards 1979, Braby 2000). Since 1987 (Moore 1988) adult *Croitana* have been known from northern Eyre Peninsula, South Australia, and assigned to *C. arenaria* (Braby 2000). These adults are 550 km removed from known central Australian populations of *C. arenaria* (Grund and Hunt 2001), are morphologically distinct and warrant subspecific status.

Depositories are abbreviated as follows: SAM - South Australian Museum, Adelaide; RG - collection of R. Grund, Adelaide; LH - collection of L. Hunt, Adelaide.

Croitana arenaria pilepudla subsp. n.

(Figs 1-4)

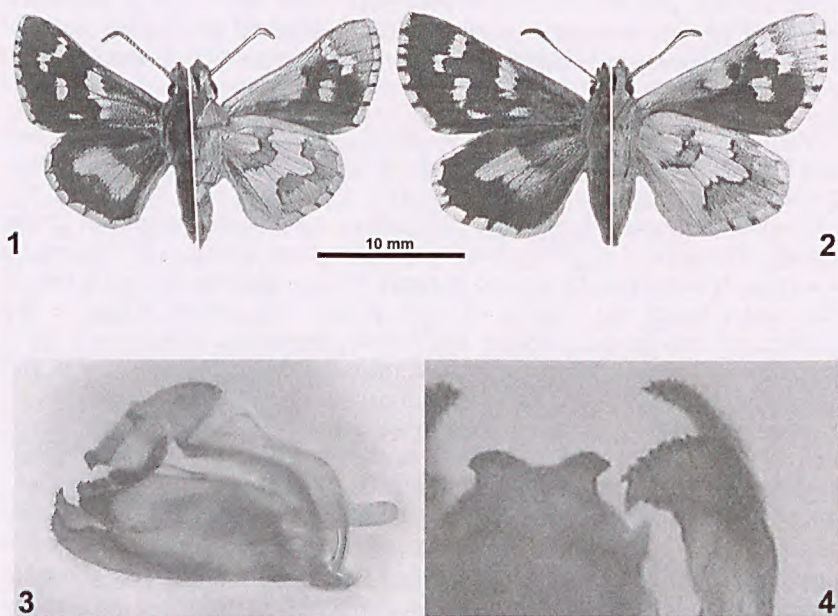
Types. *Holotype* ♂, SOUTH AUSTRALIA: Botenella Hills, northern Eyre Peninsula, 20.ix.1999, R. Grund (in SAM). *Allotype* ♀, Botenella Hills, northern Eyre Peninsula, 9.x.2000, R. Grund (in SAM). *Paratypes*: 1 ♂, Botenella Hills, 4.x.1987, M. Moore (SAM); 1 ♂, Botenella Hills, 9.x.2000, R. Grund, genitalia dissected, (RG); 1 ♂, Botenella Hills, reared ex egg emerged 4.i.2001, L. Hunt, genitalia dissected, (LH); 1 ♂, Botenella Hills, reared ex egg emerged 9.i.2001, L. Hunt (LH); 1 ♂, Botenella Hills, reared ex egg emerged 16.i.2001, L. Hunt (LH); 1 ♀, Botenella Hills, 9.x.2000, R. Grund (RG); 1 ♀, Botenella Hills, 9.x.2000, L. Hunt (LH).

Description. *Holotype* male (Fig. 1); Body above dark yellowish brown with posterior part of abdomen ringed pale yellow, beneath pale yellow, legs pale yellow, fore-leg with short epiphysis, hind tibia without median spurs; antennae dark above with shaft ringed pale yellow, beneath pale yellow, club bent before the middle, apiculus blunt, nudum brown, 12-13 segmented. Forewing 15 mm, apically pointed, costa concave in the middle, termen slightly convex, tornus obtuse, dorsum straight, hindwing rounded. Forewing upperside dark brown, basal one-third with scattered pale yellow scales merging distad with an irregular submedian row of large, nearly confluent pale yellow spots extending from space CuA₂ to nearly the costa, the spots being separated by dark veining, the spot in space CuA₂ is divided longitudinally in the middle, the spot in the cell is the largest and extends to

near the end of the cell, the basad portion is mostly free of the basal dusting of pale yellow scales, the portion next to the cubitus extending slightly basad, there are three subapical confluent pale yellow spots extending from veins R_3 to M_1 , two subterminal confluent pale yellow spots distal to the subapicals but just touching, extending from veins M_1 to M_3 , two confluent pale yellow postmedian spots extending from M_3 to CuA_2 , and an additional small postmedian elongated pale yellow spot anterior to vein $1A+2A$, cilia pale yellow chequered dark brown at tips of veins. Hindwing upperside dark brown with some scattered yellow hair scales basally, a small subbasal elongated orange cell spot, a large postmedian orange patch extending from anterior of vein M_1 to vein $1A+2A$, the inner edge is nearly straight, the outer edge is significantly extended distally in spaces M_1-M_2 and CuA_2 , the extension at spaces M_1-M_2 is confluent and extends into the subterminal area and is rounded distally (not divided), cilia pale yellow chequered dark brown at tips of veins. Forewing underside dark brown, apex pale yellow the intensity of the colour increasing apically, the costal edge is yellow, the subapical and subterminal spots distributed and coloured as on the upperside, spots between M_3 and CuA_2 orange, cell area orange distally yellowish, the orange area extending slightly posterior of the cubitus, a heavy dusting of orange scales anterior of vein $1A+2A$ and an indistinct postmedian elongated orange spot anterior to vein $1A+2A$ as on upperside, cilia pale yellow chequered dark brown at tips of veins. Hindwing underside with the basal area, the costal area, and the distad part of the anal area ($1A+2A$ and $3A$) pale yellow, the basad part of the anal area is dusted with black scaling, a large subbasal pale yellow spot edged dark brown distad in the cell and space $Sc+R_1$, a confluent submedian band extending from $Sc+R_1$ to $1A+2A$ dark brown with a heavy dusting of yellow scales, a confluent postmedian band pale yellow indistinctly narrowly edged dark brown extending from $Sc+R_1$ to $1A+2A$, the inner edge generally curved but with a noticeable extension basad in space $Sc+R_1$, the outer edge is strongly elongated distad into the subterminal area in spaces M_1-M_2 and to the terminal area in space CuA_2 , the distal end of the M_1-M_2 elongation is rounded (not divided), an incomplete subterminal band of dark brown with a heavy dusting of yellow scales, that area distad in space M_1-M_2 extending into the terminal area, a broad terminal band of very heavy pale yellow scaling overlaying brown (except in the M_1-M_2 space), cilia pale yellow narrowly chequered dark brown at tips of veins.

Allotype female (Fig. 2). Similar to the male. Nudum 13 segmented. Forewing 17 mm. Forewing above similar to male with the spots better developed, except for the spot in space CuA_2 of the submedian row of spots which is strongly divided with the portion anterior of vein CuA_2 being elongated and better developed than in the male, the basal dusting of yellow scales is also less developed than in the male causing the inner edged of the submedian row of pale yellow spots to be well defined. There is an additional small postmedian spot posterior to vein CuA_2 . Hindwing above similar to the

male, except the orange patch is more clearly defined anteriorly and does not extend beyond vein M_1 , while posteriorly it is not as well defined and becomes obscured before reaching vein $1A+2A$, the veins M_3 , CuA_1 and CuA_2 crossing the patch are marked dark brown, the distad edge of the patch is slightly indented at each vein that passes through the patch. Forewing beneath markings similar to the male, but without a dusting of yellow scales anterior of vein $1A+2A$. (The additional small yellow spots present above in the female do not occur beneath.) Hindwing beneath similar to the male except the edges of the postmedian band are clearly edged dark brown, and the distal edge of the band is slightly indented at each vein that passes through it.



Figs 1-4. *C. a. pilepudla* subsp. n. (1-2) Upper and undersides of: (1) holotype male and (2) allotype female; (3-4) Male genitalia: (3) side view complete and (4) dorso-posterior view of ampulla, harpe and uncus.

Male genitalia (Figs 3-4). Robust; combined tegumen and uncus hood-shaped, shorter than valvae with uncus directed down into valval cavity; tip of uncus strongly sclerotized and hairy, divided and produced into two bluntly pointed projections with very short teeth; flattened sclerotized dorsolateral lobes present at anterior end of uncus; gnathos region developed into large

paired bulbous pads, each pad divided into a smooth and strongly sclerotized anterior portion that is flattened basally and a posterior portion with the anterior part of the lower surface strongly sclerotized and granular, and the posterior part non-sclerotized. Vinculum curved; saccus short and broad. Valva with well developed ampulla and harpe; harpe sclerotized, about one-quarter the size and longer than the ampulla, distal portion very hairy and covered in fine teeth; at about two-thirds along harpe from ampulla junction the harpe narrows markedly ending in a flattened scimitar shape that curves dorsally and inwards and ends in a point; distal portion of ampulla strongly sclerotized, hairy, constricted, flattened, twisting to the horizontal posteriorly, the leading edge with inwardly directed fine teeth with the end of the ampulla ending with a single large spine that is directed anteriorly. Aedeagus long, simple; coecum well developed; post zonal area slightly broadened posteriorly; prezoal area of similar diameter; seminal duct enters dorsally. Juxta well developed beneath the aedeagus as a short V-shaped sclerotized plate.

Variation. In the paratype males there may be an additional small postmedian spot posterior to vein CuA_2 on the forewing upperside. The large postmedian orange patch on the hindwing above may start at M_1 , and the extension in spaces M_1 - M_2 may rarely have a slight indentation as in the female. The same elongation of the postmedian band in spaces M_1 - M_2 on the hindwing beneath may be squared or rarely have a slight indentation. In two of the reared males the dusting of pale yellow and yellow scales in the subterminal and terminal areas of the hindwing beneath is so heavy as to make these areas confluent. In another reared male the dusting of pale yellow and yellow scales in the same areas is minimal causing the brown colour to be confluent from the postmedian band to the termen. (Note: The colouration of the reared males may be an artifact as they emerged outside the normal? flight period.) In the paratype females the small spot posterior to vein CuA_1 of the postmedian area on the forewing upperside may be absent and the subapical and subterminal spots may not be touching. There may be a dusting of yellowish scales anterior of vein $1A+2A$ on the forewing underside, and the postmedian band in the hindwing underside may not be clearly outlined with dark brown. In both sexes, with ageing from flight, the orange colour above becomes yellow and the dark brown submedian and subterminal areas on the hindwing beneath become much more obvious, with the extension at the distal portion of M_1 - M_2 noticeably extending to near the termen. The nudum of the antennae varies from 12 to 14.

Etymology. 'Pilepudla' is the local aboriginal name for a water hole in the Botenella Hills area of the Eyre Peninsula, South Australia.

Distribution. Presently known from only two small areas on northern Eyre Peninsula, South Australia. Adults and early stages are known from the Botenella Hills and adjacent areas, while only early stages are known from

the south end of the Middleback Ranges. The species has been observed in flight from late September to early October.

Discussion

Croitana arenaria pilepudla is generally much larger than nominotypical *C. a. arenaria*. The overall pattern morphology of the two subspecies is similar, but they can be easily differentiated by the pattern on the hindwing underside, particularly the shape of the pale yellow postmedian band. In *C. a. pilepudla* the distal extensions of the postmedian band in spaces M_1 - M_2 and CuA_2 are much more obvious. In *C. a. arenaria* (Edwards 1979) the dark brown veinal indentations along the distal side of the postmedian band are much better developed than in *C. a. pilepudla*, producing a double-pronged pattern at M_1 - M_2 , which is usually rounded or squared in *C. a. pilepudla*. The pale yellow terminal spots of the hindwing beneath in *C. a. arenaria* are not developed in *C. a. pilepudla*, being replaced by a heavy terminal dusting of pale yellow scaling. In *C. a. arenaria* the yellow markings on the forewing above are usually much better developed than in *C. a. pilepudla*. There are also some differences in male genitalia, particularly the valvae. In *C. a. pilepudla* the genitalia are more robust and generally wider. The combined tegumen and uncus is wider, the saccus is wider, and the coecum of the aedeagus is more robust. The harpe of the valva does not gradually taper posteriorly as in *C. a. arenaria* (Edwards 1979) but narrows abruptly along its length, and the posterior end of the harpe is not as strongly constricted as in *C. a. arenaria*. The ampulla of the valva is more broader posteriorly and the teeth at the end of the ampulla are much smaller and more numerous than in *C. a. arenaria* and ends in a single large spine that is directed anteriorly (Fig. 4) in contrast to *C. a. arenaria* in which the final spine is directed inwards (rather than anteriorly).

C. a. pilepudla differs from *C. aestiva* and *C. croites* in that the postmedian band on the hindwing underside is not strongly displaced basad in space $Sc+R_1$.

C. a. pilepudla represents an isolated subspecies of *C. arenaria*. The nominotypical subspecies is probably confined to central Australia, including the far northwest region of SA (Grund and Hunt 2001) and the Macdonnell Ranges region (Braby 2000). These two subspecies are separated by hot, dry, low rainfall areas where the foodplant appears to be unable to survive or maintain green growth for any extended period of time (Grund and Hunt 2001).

Since the initial discovery of *C. a. pilepudla* by M. Moore the author has been successful in collecting further specimens and documenting its life history (Grund 1999, Grund and Hunt 2001). The adult skipper is very secretive and therefore not often seen in flight. During the adult flight season, the presence of eggs is often the only means of detecting the skipper. When observed, both sexes are usually seen feeding on low growing flowering bushes of

Westringia rigida (Lamiaceae). Males are sometimes seen basking in the sun on the hillsides, down from the hilltops.

There have been suggestions by other scientists that *C. a. pilepudla* may represent a distinct species, but to resolve this question would require allozyme or DNA analysis, which is beyond the scope of this study.

Acknowledgements

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